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ABSTRACT

This study focused on the impact of student-faculty interaction on academic self-confidence, examining the impact of negative student-faculty interaction on academic self-confidence. In addition, the impact of diverse peer interaction on students academic self-confidence was examined. Data were from the Cooperative Institutional Research Program (CIRP) database for two studies: the 1996 Student Information Form and the 2000 College Student Survey. The sample analyzed included 7,440 first-time, full-time students at 115 predominantly white institutions. Analyses were done by combining sets of similar variables into nine blocks representing input or environmental variables and entering them into a stepwise regression. In spite of some identified limitations of this research, a positive relationship appears to exist between diverse peer interaction and students academic self-confidence. The hypothesis that negative interactions with faculty would have an impact on students academic self-confidence was not supported, but student-faculty interaction of a positive sort did help students increase their academic self-confidence. It is significant that diverse peer interaction and student-faculty interaction may play a key role in the development of academic self-confidence in students is of importance since these are conditions that can be created in the educational environment. An appendix lists the study variables. (Contains 1 table, 1 figure, and 22 references.) (SLD)

The Impact of Motivation, Student-Peer, and Student-Faculty Interaction on Academic Self-Confidence*

Paper for the Annual Meeting of the American Educational Research Association

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For decades literature on entering college freshmen suggests that many students report having low academic self-confidence (Astin, 1993; Pascarella & Terenzini, 1991; Tinto, 1970). Lack of self-confidence has been identified as a key element in a self-defeating cycle leading to anxiety and avoidance behaviors that can interfere with a person's academic performance (Barrow, 1986). According to Barrow (1986) battles with self-confidence are particularly evident in late adolescence and young adulthood. This is a time when most young adults are leaving home, facing new experiences, and exploring new environments such as college. The quality of these new experiences in the college environment can contribute to a growth or decline in academic self-confidence thereby influencing academic performance and persistence (Parajes, 1996; Zimmerman, 1995). Therefore, an important question is, "How does the college environment impact students' academic self-confidence?"

Previous studies have addressed the above question by controlling for students' incoming characteristics while examining the impact of the college environment on academic self-confidence (Astin, 1993; Pascarella, 1985b; Pascarella, Smart, Ethington, & Nettles, 1987; Smart & Pascarella, 1986). Without controlling for incoming variables, it is difficult to separate the effects of pre-existing variables from the effect of the environment when assessing academic self-confidence. For example, it is important to control for pre-existing characteristics such as gender, negative affect, and motivation because researchers have found that these variables influence academic self-confidence (Astin, 1993; Deci & Ryan, 1992; Pascarella & Terenzini, 1991; Wingfield, Eccles & Pintrich, forthcoming). Controlling for these variables isolates and allows researchers to measure the impact of the environment on the outcome measure.

Numerous, researchers have evaluated the impact of the environment on academic self-confidence. In particular, past studies have looked at the impact of student-peer interaction and student-faculty interaction on academic self-confidence (Astin, 1977; Astin, 1993; Pascarella, 1985b; Pascarella, Smart, Ethington, & Nettles, 1987; Smart & Pascarella, 1986; Pascarella & Terenzini, 1991).

The role of student-peer interaction has been widely studied in student development research (Astin, 1993; Chickering, 1969; Pascarella & Terenzini, 1991). According to Pascarella and Terenzini (1991) research suggests that the most influential forces acting on students' academic self-image (academic self-confidence) result from students' involvement with peers. Pascarella (1985b) analyzed Cooperative Institutional Research Program (CIRP) data from 5,200 college students studied over two years. After controlling for eight pre-college characteristics, Pascarella (1985b) found that peer interaction was positively and significantly related to students' academic self-confidence. According to Pascarella and Terenzini (1991) these findings of peer influence are supported by evidence from other national longitudinal studies (see Pascarella, Smart, Ethington, & Nettles, 1987; Smart & Pascarella, 1986).

While the role of peer interaction on academic-self confidence has been examined, few researchers have looked at the impact of *diverse* peer interaction on academic self-confidence (diverse is defined as socializing with someone of a different racial or ethnic group). Instead, a number of researchers have examined the impact of diverse peer interaction on other student outcomes. For example, Milem (1994) examined the effect of diverse peer interaction on students' attitude toward race using CIRP data. Over 13,500 students at 159 institutions were surveyed twice over a four-year

period, first in the beginning of their freshman year in 1985 and again in 1989. Milem (1994) found that students who socialized more frequently with someone of a different race and who engaged in more frequent discussions of racial issues were more likely to show an increased commitment to the goal of helping to promote racial understanding.

Using CIRP data, Antonio (2001) explored the impact of interracial interaction on students' cultural knowledge and understanding. He examined 8,877 first-time, full-time freshman attending 115 institutions. He looked at data from two cohorts who were surveyed the beginning of their freshman years (1991 and 1992) and who were surveyed again in 1996. Antonio (2001) found that interracial interaction was very strongly related to student gains in cultural knowledge and understanding.

Chang (1999) examined how the diversity of the student body impacted how often students socialized with peers of a different race and how often students discussed racial issues. Next he looked at the impact of socializing with students from different races and discussing racial issues on intellectual and social self-concept, retention and college satisfaction. Chang (1999) found that socializing with someone of a different race had an indirect positive effect on intellectual self-concept and retention and had a direct positive effect on student satisfaction with college and social self-concept. Building on the work of previous scholars I will explore the impact that diverse peer interaction has on students' academic self-confidence.

In addition to student-peer interaction, student-faculty interaction has been recognized as an important factor in college student development (Astin, 1993; Pascarella & Terenzini, 1991; Tinto, 1970). Previous researchers have discovered that faculty influence students values, attitudes, beliefs, and behavior (Wallace, 1963; Pascarella,

1980 as cited in Pascarella & Terenzini, 1991). Astin (1993) used CIRP data that was collected form from 24,847 entering university freshman in 1985 and in 1989. After controlling for entering characteristics Astin (1993) found that students who interacted more often with faculty reported higher academic-self confidence.

The quality of student-faculty contact is as important as the frequency of contact. Numerous studies have examined the impact of positive student-faculty interactions on students' development. Endo & Harpel (1983) conducted a longitudinal study to examine the impact of these positive interactions on students' self-reported growth in cognitive measures (similar to academic-self confidence). When controlling for variables such as academic ability and degree aspirations, the researchers regressed student reported cognitive growth on measures of quality interaction with faculty. The researchers found that students who perceived faculty as concerned about students and who developed close relationships with faculty reported the most academic growth.

This research will attempt to replicate the findings of previous studies concerning the impact of the frequency of student-faculty interaction on academic self-confidence with a different cohort of students (Astin, 1993; Endo & Harpel, 1983). In terms of quality instead of looking at positive student-faculty interactions, the current study examines the impact of negative student-faculty interaction on academic-self confidence. In addition, this study seeks to extend the current body of knowledge by investigating the impact of diverse peer-interaction on students' academic self-confidence. In particular, after controlling for students' incoming characteristics, the researcher will focus on delineating the impact of multiple diverse peer interactions on students' academic self-confidence. Conducting this research is essential because while background

characteristics are fixed, diverse peer and student-faculty interactions are malleable and can be fostered suggesting future program development to support such interactions.

Research Questions

1. Does interacting with diverse peers impact academic-self confidence?
2. Does interacting with faculty impact academic-self confidence?

Hypothesis 1: Students who interact more often with diverse groups of peers in college will have higher academic self-confidence.

Hypothesis 2: Students who interact with faculty more frequently will have higher academic self-confidence.

Hypothesis 3: Negative interactions between students and faculty will decrease students' academic self-confidence.

Data Source

The data in this study were drawn from the Cooperative Institutional Research Program (CIRP) database of college students. The CIRP is an ongoing collection of college student data sponsored by the American Council on Education and the Higher Education Research Institute (HERI) at UCLA. The CIRP data used in this study included information drawn from two surveys: The 1996 Student Information Form (SIF) and the 2000 College Student Survey (CSS)

The 1996 SIF was administered to first time college freshman during orientation programs the first weeks of fall classes. Responses to the SIF were received from 251,232 students at 494 institutions. The CSS was administers to students (selected by their institution) in the spring of 2000 and as a result 38,964 responses were received from 161 institutions. Of the students who filled out the 1996 SIF 14,975 also filled out the 2000

CSS. The specific sample analyzed for this study included 7,440 first-time, full-time students attending 115 predominantly White institutions. Given the longitudinal nature of this study, only students who completed all items of interest (demographic, affective, motivational, and diverse peer and faculty interaction measures) on both surveys were included. The sample was composed only of students who attended four-year schools; students attending two-year schools were excluded because of the small number of participants. While the sample is not nationally representative of the population, it does represent a large number of students from various higher education institutions.

Design

This study follows Astin's (1993) Input-Environment-Outcome (I-E-O) model. "Inputs" refer to the students' entering characteristics, "environment" is that which the student is exposed to during college, (i.e., faculty, peers, diverse views, etc.) and "outcomes" are the students' characteristics after interacting with the environment (Astin, 1993). The power of Astin's I-E-O model is its ability to allow researchers to measure student change during college by comparing outcome characteristics with input characteristics. The purpose of the model is to assess the impact of the (college) environment on the outcome measure while controlling for input characteristics.

In the current study, the analyses were done by combining sets of similar variables into nine blocks representing either input or environmental variables and entering them into a step-wise regression (See Figure 1 for a complete blocking of the variables).

Input Variables

The first five blocks of variables were designed to control for incoming student characteristics. Controlling for these effects served two purposes. First, these variables were examined to determine the relationship between the entering student characteristics and their academic self-confidence. Second by controlling for incoming characteristic, the researcher was able to separate the effects of the incoming characteristics from the environmental effects on academic self-confidence. Without providing these controls, incorrect conclusions regarding the impact of the college environment might be drawn (Astin, 1991; Astin, 1993).

The first block included a measure of students' incoming academic self-confidence. The academic self-confidence scale was constructed using six items from Astin's (1993) eight-item "intellectual-self-esteem" scale[1]. Students were asked to rate themselves on the following items as compared the average person of their age: academic ability; public speaking ability; writing ability; mathematical ability; intellectual self-confidence; and drive to achieve. A reliability analysis of these six items yielded an alpha of α=.71.

The second block contained students' gender, mother's and father's educational attainment, high school GPA, mathematical SAT score and verbal SAT score (Appendix A contains a complete list of variables). The third block included students' negative

[1] Astin (1993) conducted a factor analysis of the original eight items that made up his intellectual self-esteem scale. The items and factor loadings include: academic ability .93, public speaking ability .91, writing ability .87, mathematical ability .80, intellectual self-confidence .90, drive to achieve .91, leadership ability .90, and election to academic honor society (expectation) .87.

affect and intrinsic and extrinsic motivational state[2]. The fourth block measured frequency of students' diverse peer-interaction in high school and the fifth block measured frequency of student-faculty interaction in high school (Figure 1 contains complete blocking of the variables).

College Environment Variables

The last four blocks measured the environmental effects on academic self-confidence. The sixth block contained institutional characteristics composed of the institutional type (university or four-year school) and institutional control (public or private) and the seventh block included a measure of college GPA. The eighth and ninth block contained the variables hypothesized to impact academic self-confidence. Specifically, the eighth block contained three measures of diverse-peer interaction which included the amount of time in the past year students spent socializing with someone of a different race, the students' self reported change in their ability to get along with others and their increase in commitment to promote racial understanding. The final block contained measures of student-faculty interaction frequency and negiativeness (See Appendix A for a list of variables that these measures were composed of).

Outcome Variable

The academic self-confidence outcome scale was created with the same six items from the academic self-confidence pre-test scale including; academic ability, public speaking ability, writing ability, mathematical ability, intellectual self-confidence, and drive to achieve, α=.71 (Astin, 1993). Academic self-confidence was measured at the beginning of the students' freshman year (pretest) and obtained again on the same

[2] The item-Goal: Develop a meaningful philosophy of life was used as a proxy for intrinsic motivation and the item-Goal: Be very well off financially was used as a proxy for extrinsic motivation.

students four years later (posttest). The posttest academic-self confidence measure is the dependent variable for this study.

Results

The academic self-confidence pretest was found to be strongest predicator of academic self-confidence posttest (β=.46, $p<.01$, betas are given at the final step, see Table 1). In terms of input variables, students showing the greatest increase in self-confidence were men, students with high SAT scores, higher degree aspirations, and high incoming intrinsic and extrinsic motivation (see Table 1).

While SAT verbal and math scores had a positive effect on students academic self-confidence (β =.01, $p>.05$; β =.03, $p>.05$ respectively) both scores became non-significant when college grade point average was taken into account probably because high achievers in college tend to have high SAT scores. Similarly students with higher degree aspirations had higher academic self-confidence however, this relationship was eliminated when student-faculty interaction entered the equation (β =.01, $p>.05$). Both intrinsic and extrinsic motivation also had a significant positive effect on students' academic self-confidence (β =.04, β=.09 respectively, $p<.01$). These motivation variables remain significant through out the regression equation.

The students who showed the lowest increase in academic self-confidence were women (β =-.15, $p<.01$), students who felt depressed (β = -.04, $p<.01$) and overwhelmed (β = -.05, $p<.01$). Women began with lower academic self-confidence than men did and the differences between the two groups increased over time despite the fact that women reported receiving higher grades than men. In addition, people who were depressed and overwhelmed when they began college were more likely to report lower academic-self

confidence. The percentage of variance explained by the input variables in academic self-confidence was 36 percent ($R=.60$, $p<.01$).

Of the college environmental variables assessed, college GPA was the strongest predictor of academic self-confidence ($\beta=.20$, $p<.01$). Institutional control (private universities) was also a positive predictor of academic self-confidence until faculty interaction entered in the equation. These two variables accounted for two percent of the variance in the academic self-confidence.

As hypothesized after controlling for the input variables diverse peer interaction positively impacted academic self-confidence. Specifically socializing with people of different races ($\beta=.02$, $p<.01$) and increasing ones commitment in promoting racial understanding ($\beta=.03$, $p<.01$) effected academic self-confidence positively. Also, students who stated a change in their ability to get along with different races reported higher academic self-confidence ($\beta=.07$, $p<.01$). However, these variables only explained one percent of the variance in the dependent variable.

As expected, the frequency of student-faculty interaction was a positive predictor of academic self-confidence. Of the three variables used to measure student-faculty interaction frequency two were significant. Students who talked more with faculty outside of class ($\beta=.06$, $p<.01$) and who received advice from faculty about their educational program reported significantly higher academic self-confidence ($\beta=.07$, $p<.01$) however, being a guest in a faculty's home was not significant. The student-faculty interaction variables explained one percent of the variance in the dependent variable.

Lastly, the researcher asserted that negative interactions with faculty would impact students' academic self-confidence negatively. However, despite the original hypothesis the quality of the interaction did not have an impact on self-confidence. Negative interactions (receiving negative feedback from faculty and not being taken seriously by faculty) did not significantly impact students' academic self-confidence. The total percentage of variance accounted for by all the environmental variables in academic self-confidence was four percent.

The following input variables did not enter the regression equation and were not significant predictors of academic self-confidence: mother's and father's educational level, high school GPA, socialized with different racial groups in high school, asked a teacher for advice in high school and was a guest in a teacher home in high school. Aside form the environmental variables already discussed institutional type (university vs. four-year school) did not enter the regression equation. It had no impact on students' academic self-confidence.

Discussion

The purpose of this study was to examine how diverse peer and student-faculty interactions in the college environment impact students' academic self-confidence. Although the effect is small the results show that students, who interacted more frequently with interracial peers, reported higher academic-self confidence. In addition, the results show that students who increased their commitment to promoting racial understanding and who reported a change in their ability to get along with different races reported higher academic self-confidence. These effects were observed even after controlling for the students' incoming characteristics. This study confirms previous

findings that socializing with students of different racial groups has educational benefits (Astin, 1993; Chang, 1999). Specifically, this study confirms that student diversification positively affects academic self-confidence.

In addition, this research found that student-faculty interaction helps students increase their academic self-confidence. The results that students who spend more time talking with faculty outside of class and receiving advice from faculty about educational programs report significantly higher academic self-confidence contribute to the research knowledge base and replicate finding from previous researchers (Astin, 1994; Endo & Harpel, 1983). This finding is not surprising since interacting with faculty is part of being academically engaged and research shows that more involved students do better in college (Astin, 1993). However, it is interesting to note that of the three student faculty interaction variables, the two significant variables were academic while the third social variable; being a guest in a faculty's home was not significant. This is not surprising since the dependent variable is *academic* self-confidence.

Finally, the hypothesis that negative interactions with faculty such as, receiving negative feedback and not being taken seriously by faculty would impact students' academic self-confidence negatively was non-significant. No relationship was found between these variables. Perhaps these variables were not appropriate measures of negative interactions or perhaps positive student-faculty interactions have a stronger impact on students.

Limitations

The main limitation of this study is the inability to draw a direct causal connection between the environmental variables (diverse peer interaction and student-faculty

interaction) and academic-self confidence because of a lack of temporal ordering. The outcome variable was obtained at the same time as the environmental measures. In other words, it is not clear whether diverse peer/student-faculty interaction increases students' academic self-confidence or whether students with higher academic self-confidence seek out interactions with diverse peers and faculty. The causal direction of this relationship is not clear and it is also possible that this relationship is reciprocal. Future research designs should address the issue of causal direction by temporally ordering the variables and taking measures of the environmental variables and the outcome variable at different points in time.

A second limitation of this research is the non-representativeness of the sample. Because the majority of the sample was White and attended private institutions we are unable to generalize the findings of this research to the entire population of college students. Future research should explore ways to address the generalizibility of the results.

A final limitation of the research is the small effect accounted for in academic self-confidence by diverse peer interaction and student-faculty interaction. The fact that these variables explain so little of the variance in the dependent variable is of no surprise given all the possible college factors that can impact academic self-confidence. Although the effect is small, 2 percent, it is significant and may have practical importance. For example, what might be the result if diverse peer and student-faculty interaction did not exist?

Conclusions and Future Study

Despite the limitations of this research a positive relationship appears to exist between diverse peer interaction and students' academic self-confidence. These findings support opportunities to develop programs that better diversify campuses by integrating students of different backgrounds. In light of this relationship, it is important that future researchers continue to examine the impact of diverse peer interaction and perhaps explore ways to foster diverse peer relationships on college campuses.

It is interesting that on many campuses there are programs in place such as tutoring and mentoring, to assist students with their academic success (a variable found to increase academic self-confidence) but few programs to encourage student interaction with diverse peers. Universities typically focus on increasing diversity in admissions but what about diversity after students are admitted? What about classroom, dorm, and student club diversification? Perhaps educators and policy makers should be exploring the benefits of encouraging diversity from admissions to graduation.

A well-proven relationship exists between student-faculty interaction and academic self-confidence; college campuses should develop programs to encourage student-faculty interaction. These programs should promote and encourage faculty to develop relationships with students. Such programs could include: faculty making themselves more available to students by increasing office hours and by encouraging students to attend office hours.

Both diverse peers interaction and student-faculty interaction may play a key role in the development of academic self-confidence in students. This is of significance because relationships between diverse groups of students and between student and faculty can be created. It is important to develop these relationships because previous research shows that academic self-confidence in an important factor in student achievement and persistence (Parajes, 1996; Zimmerman, 1995).

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Table 1
The Impact of Student-Faculty Interaction on Students' Academic Self Confidence (N=7418)

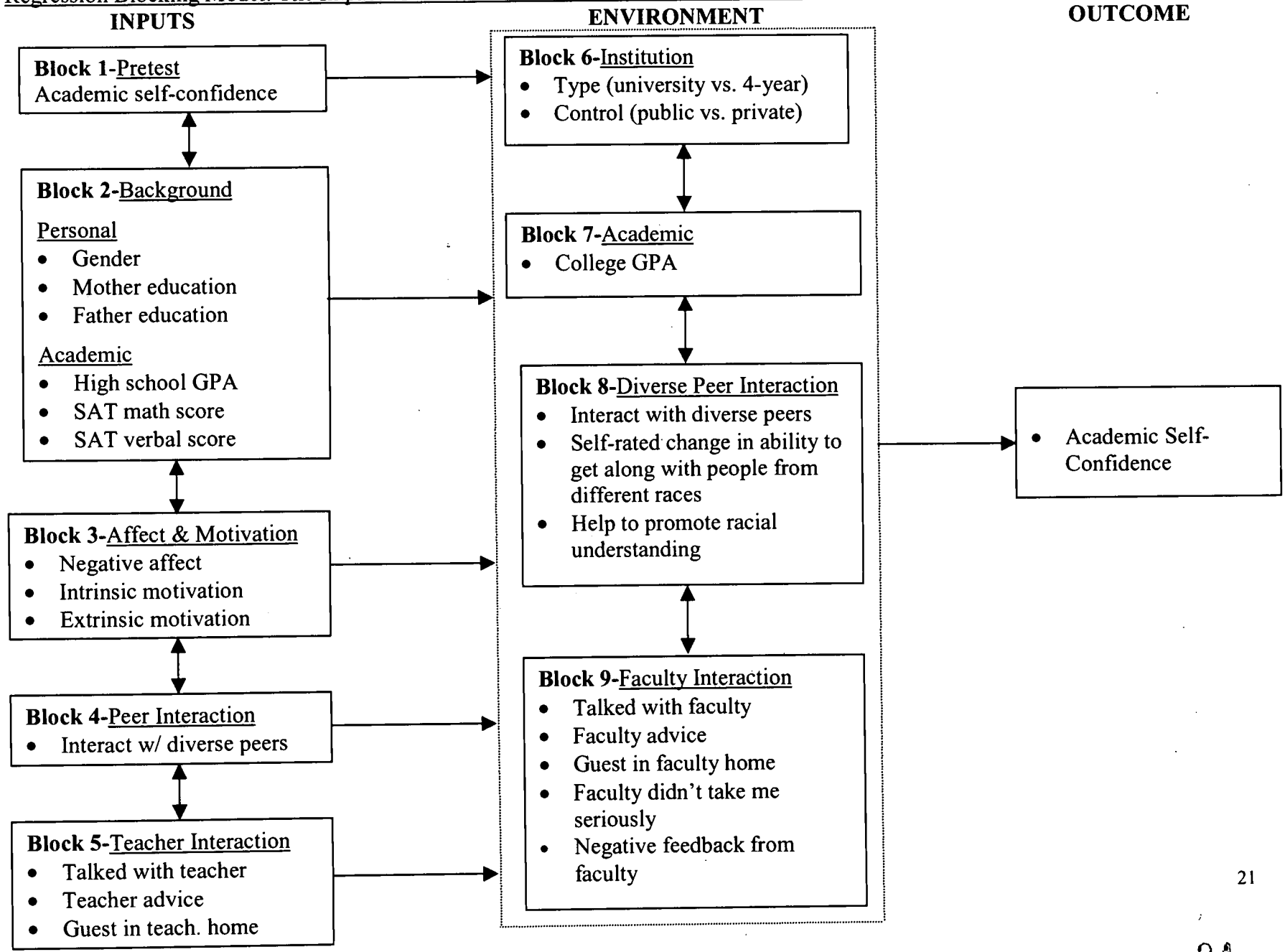
					Beta[3] After Step				
Step		R	Variable	r	Pretest	Background	Inst. Char.	College GPA	Diverse Peer	Faculty Intc
Pretest										
Block 1	1	.57	Academic self-confidence (1996)	.57	.57	.52	.50	.46	.46	.46
Inputs										
Block II	2	.58	Sex: Female	-.21	-.13	-.13	-.11	-.15	-.15	-.15
	3	.59	SAT verbal	.25	.05	.04	.04	**.01**	**.01**	**.01**
	4	.59	Degree aspire	.17	.04	.03	.02	.02	.02	**.01**
	5	.59	SAT math	.29	.07	.03	.04	**.01**	**.01**	**.03**
Block III	6	.59	Be well off financially (1996)	.04	.05	.05	.06	.08	.08	.09
	7	.60	Develop meaning (1996)	.16	.04	.04	.05	.05	.04	.04
	8	.60	Depressed (1996)	-.11	-.05	-.03	-.03	-.04	-.04	-.04
	9	.60	Overwhelmed (1996)	-.10	-.06	-.03	-.03	-.03	.03	-.03
BlockV	10	.60	Talk teachers high school (1996)	.06	**.01**	.02	.02	.03	.03	**.01**
Envirmnt										
Block VI	11	.60	Institution control	.02	.04	.03	.03	.03	.02	**.01**
Block VII	12	.62	College GPA	.32	.18	.21	.22	.22	.22	.20
Block VIII	13	.63	Accepting different races (2000)	.09	.08	.09	.08	.08	.07	.07
	14	.64	Promote racial understand (2000)	.06	.05	.06	.06	.06	.04	.03
	15	.64	Socialize w/ different race (2000)	.03	.02	.02	.02	.02	.02	.02
Block IX	16	.64	Faculty gave me advice (2000)	.16	.11	.12	.12	.09	.08	.07
	17	.64	Talk with faculty aftr class (2000)	.14	.10	.10	.09	.08	.06	.06

Source: Cooperative Institutional Research Institute, Higher Education Research Institute, UCLA. CIRP (1996) and CSS (2000).
Coefficients in **bold** are not significant, p>.05

[3] The coefficient for any variable not yet entered in the equation shows the beta that variable would receive if it were entered into the equation at the *next* step.

Figure 1

Regression Blocking Model: The Impact of Environmental Variables on Academic Self-Confidence, Controlling for Inputs Variables



Appendix A

Complete Variable List

Variables	Response Choices and Coding
Dependent Variable	
Academic self confidence scale (α=.71)	Six item composite scale scored from 6-lowest 10 percent to 36-highest 10 percent
Independent Variables	
Inputs	
Precollege Characteristics	
Academic self confidence pretest[3] (α=.71)	Six item composite scale scored from 6 lowest 10 percent to 36-highest 10 percent
Gender-female	1-male, 2- female
Degree aspirations	1-none, 2-Associates or Vocational certificate, 3-Bachelor's, 4-Master's, 5-Doctorate including PhD, EdD, MD, DO, DDS, DVM, JD, and LLB
Mothers educational attainment	1-grammar school or less to 8-graduate degree
Fathers educational attainment	1-grammar school or less to 8-graduate degree
High school GPA (self report)	1-less than C- to 8-A or A+
SAT: Math (self report)	Range 200 to 800
SAT: Verbal (self report)	Range 200 to 800
Affective and Motivation Variables	
Felt depressed	1-not at all to 3-frequently
Felt overwhelmed	1-not at all to 3-frequently
Goal: Develop a meaningful philosophy of life	1- not important to 4-essential
Goal: Be very well off financially	1- not important to 4-essential
High school peer and teacher interaction variables	
Socialized with another racial/ethnic group	1-not at all to 3-frequently
Hours per week: Talking with teachers outside of class	1-none to 8-over 20
Asked a teacher for advice after class	1-not at all to 3-frequently
Was a guest in a teacher's home	1-not at all to 3-frequently

[3] The academic self-confidence scale included; academic ability, public speaking ability, writing ability, mathematical ability, intellectual self-confidence, and drive to achieve. The items were chosen based on an original factor analysis conducted by Astin (1983) where the loading were all fairly high: academic ability .93, public speaking ability .91, writing ability .87, mathematical ability .80, intellectual self confidence .90, and drive to achieve .91. Students were asked to rate themselves on the six items as compared with the average person of their age. Response choices included: 1-lowest 10 percent, 2-below average, 3-average, 4-above average, and 5-highest 10 percent.

Complete Variable List Continued

Variables	Response Choices and Coding
Environmental Variables	
Institutional Characteristics	
Institutional type	1-university or 2-four-year college
Institutional control	1-public or 2-private
College Characteristics	
GPA	1-C- or less (below 1.75) to 6-A (3.75-4.0)
Diverse Peer-Interaction	
In the last year: Socialized with someone of a different racial or ethnic group	1-not at all to 3-frequently
Self reported change: Ability to get along with people of different races cultures	1-much weaker to 5-much stronger
Goal: Help promote racial understanding	1-not important to 4-essential
Faculty Interaction	
Frequency:	
In the last year: amount of time during a typical week talking with faculty outside of class	1- none to 8-over twenty hours
How often have professors at your current college provided you with advice and guidance about your educational program	1-not at all to 3-frequently
Since entering college, indicate how often you have been a guest in a professors home	1-not at all to 3-frequently
Quality:	
Since entering college, indicate how often you feel your comments were not taken seriously by faculty	1-not at all to 3-frequently
How often have professors at your current college provided you with negative feedback about your academic work	1-not at all to 3-frequently

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